

# *Workers' Knowledge on Noise and its Effect in the Food Industry*

*Ane Gleisi Vivan\**, *Thaís C. Morata\*\**, *Jair M. Marques \*\*\**.

\* Speech Doctor - Master degree.

\*\* PhD – Professor and Researcher.

\*\*\* Master Degree.

Institution: *Universidade Tuiuti do Paraná*  
*Tuiuti University.*  
Curitiba / PR – Brazil.

Address: Rua Marcelino Champagnat, 505, Bairro Mercês - Curitiba / PR – Brazil.

Address for correspondence: Ane Gleisi Vivan - Rua Dr. Carlos Barbosa, 159 – Centro – Casca / RS – Brazil – Zip code: 99260-000 - Telephone: (+55 54) 3347-2263  
– Fax: (+55 54) 3444-3379 – E-mail: anegleisi@net11.com.br

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## SUMMARY

- Introduction:** Work in the field of workers' health involves monitoring of the work environment, the development of preventive programs and training and education. Workers' knowledge of the workplace risks can influence their effective participation in preventive programs and the success of such initiatives.
- Objective:** The objective present study was to verify the knowledge of employees' of a meat-packing company on the auditory effects of noise.
- Method:** The participants were randomly selected, interviewed and had their hearing tested. Their ages ranged between 25 and 55 years, and their tenure was at least 5 years. Initially an audiometric test was conducted and, and in a second moment a questionnaire was applied. It was entitled as "Beliefs and attitudes on auditory protection and hearing loss", which was developed by the National Institute for Occupational Safety and Health, USA.
- Results:** statistically significant correlations were observed between the perceptions of obstacles for preventive action (comfort) and the noise level in the work department; between the perception of obstacles for preventive action (communication) and the result of the pure-tone audiometry, between the perception of obstacles for preventive action (convenience and availability) and the work section, between the self-efficacy and the audiometric result and between the self-efficacy and tenure.
- Conclusion:** Our results demonstrate employees' knowledge regarding hearing and hearing loss prevention and could guide future preventive efforts.
- Key words:** audition, attitude, behavior.

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## INTRODUCTION

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The researches on the health of the employee, at national and international levels, were decisive for the implementation and update of laws and rules which control several aspects of the labor relationships and labor conditions, and they still focus on increasing our knowledge, interfering and promoting changes, in order to keep this process dynamic. However, laws and rules can only reach their goals if followed by their effective practice, in other words, when they are obeyed.

It is up to the health experts specialized in the employee's health to know the risks and the consequences of these exposures, as well as the rules and laws that direct these activities. This kind of acting involves the monitoring of the working environment, development of programs, research actions, guidance and group training or individual orientation. In several countries, it is recognized that for the success of this program the commitment of those individuals under risk is necessary, in other words, the employees (NIOSH, 1996).

The Program on Hearing Loss Prevention (PHLP) plays an important role in the activities destined to the protection of the employee's health against the wastage and/or loss caused by the occupational noise, which have consequences in the professional performance, in the family relationships and in the participation in the society. The PHLP refers to a group of actions that focuses on minimizing risks, avoiding the wastage and/or hearing losses related to work.

This program consists of measures which are focused on the reduction of environmental risks through the collective protection, in other words, the monitoring of the levels of sound pressure, modification or substitution of equipment that rises the level of noise and individual protection, which refers to the supply of adequate protective equipment, awareness of the employees on its use and audiometric monitoring, for the measure of control and evaluation of effectiveness of the PHLP.

It is important for the employees to take part in the process and be aware of the importance of their hearing integrity, the risks and consequences of noise for the health and at work, the ideal way of wearing the hearing protector provided by the company, aiming more security. In this way they will be able to share information among their co-workers, increasing the participation of the employees in the campaigns and actions promoted by the Company through the PHLP Team.

It is essential to evaluate what kind of information

the employee has on Hearing, Hearing Loss, Noise and Hearing Protection, or even what actions and attitudes can be required from them without promoting information about these aspects through training courses, lectures and seminars beforehand, in other words, interactive activities which raise interest on the subject.

For the NIOSH (1996), training is a critical element of a program for efficient hearing prevention, for in order to get sincere support from the management and the active participation of the employees, it is necessary to educate and motivate both groups. A program for hearing loss prevention which does not emphasize the importance of education and motivation is likely to fail, for the employees do not understand why their cooperation is necessary and the administration will not demonstrate the necessary commitment. Employees and managers who care about their hearing and understand the reasons why the program for hearing preservation exists and work in the company will be more stimulated to participate for the benefit of all the others, instead of facing the program as something imposed.

In this way, this study aims to verify the knowledge of the employees who had been exposed to industrial noise in relation to hearing loss and noise, information which is necessary for the promotion of auditory health. The variables which can be associated to the information and attitude of the employees concerning their exposure to noise and the risk of hearing loss will be raised.

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## METHOD

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In order to reach the proposed objective, the survey "Beliefs and Attitudes on Hearing Protection and Hearing Loss – Part A", developed and validated by researchers under a contract of NIOSH (1996), from the United States (STEPHENSON & MERRY 1999, contract NIOSH number 211-93-006), which was applied after the frequent audiometrics was conducted. The questionnaire was applied in order to obtain information from the employees on their knowledge and behavior concerning hearing loss and noise.

This study was approved by the Committee on Ethics in Research in Humans and Animals of Universidade Tuiuti do Paraná – CEP–UTP, under number 086/2006.

With the result of this work, it will be possible to identify some factors that will contribute to the elaboration of proposals and specific and efficient measures for the prevention of hearing loss. The participants of this research had been informed about it and signed a Term of Free and Clarified Consent in order to take part in it.

In this company there are the Program for Prevention of Environmental Risks – PPER, the Program for Medical Control of Occupational Health – PCMOH and the Program for Hearing Preservation – PHP. In this way, analyses of environmental noise are made as well as of the environments and workplaces of the industry, consultation and frequent medical exams and audiometrics in all the employees who are exposed or not to noise.

### **Characterization of the population**

The studied population was composed of employees of the food industry in the state of Rio Grande do Sul, whose activity is the slaughter of chicken. The sectors of production of this company work 24 hours a day, divided into three work shifts, exposed to low intensity noise, equal or superior to 85 dB (A), with average time of exposure of eight hours a day.

One hundred employees were evaluated and interviewed, randomly selected, both men and women between the ages of 25 and 55.

Through the verification of the survey, answered by the 100 participants of the research, it is observed that 36 of them (36%) were answered by women employees and 64 of them (64%) by men employees. The average age of the participants was 42 years old. Furthermore, all the employees who took part in the survey used to wear auricular shell protectors, model 3M 135 or 3M 1450. It is worth to mention that, in the beginning of this study, some employees used to wear auricular plug protectors, model Pomp Plus and others used to wear shell protectors, whose models have been previously mentioned, however, as the survey was being conducted, due to an order from the general manager of the company, all the employees were given shell protectors, model 3M 1435 or 3M 1450, independently of the working sector and/or level of noise in the sector. In this way, the employees started wearing this kind of protector, and the plug protectors model Pomp Plus became extinct, which had been previously worn by some employees of the company.

The research was divided into two parts. First, the auditory evaluation was done, which respects all the criteria suggested by *Portaria 19* of *Ministério do Trabalho* and by the National Committee on Noise and Auditory Preservation, which was done by the author of the present work. In the same occasion, the survey was conducted.

### **Auditory evaluation**

The auditory evaluation of the employees was

included in this study in order to describe the audiometric results of the participants of the survey and evaluate if they influence the attitudes of the employees in relation to the auditory conservation.

The following procedures were used:

- 1) Anamnesis: it was done to collect information from the patient. A brief and chronologically ordered description of all the professional activities was done, describing the type of activity, the harmful agents to which they were exposed, the level of noise, the use of individual protectors, accidents that have happened, contracted occupational diseases.
- 2) Meatoscopia: it aimed to investigate the presence of serumen and/or strange body in the external acoustic meato, which could alter the result of the audiometrics;
- 3) Tonal Audiometrics: the evaluations will be done in an acoustic booth, with acoustic repose of 14 hours. An AD 229 audiometer was used, with TDH-39 headphones, adjusted according to the present rules, NR7 and *Portaria 19* (BRASIL, 1998). The evaluated frequencies from above were from 250 Hz to 8000 Hz and when the limiar found was above 25 dB, the bone pathway was done from 500 to 4000 KHz.

The audiometric tests were classified according to the recommendations of the law (*Portaria n. 19* of NR-7 - MTb):

- Audiogram within the acceptable limits (Compatible with the Normality): when the tonal limiar in all the frequencies showed values inferior and equal to 25 dB (NA). However, it is possible to observe an audiogram compatible to the normality, but with a trace which is similar to the PAIR (incision in the high frequencies), indicating a probable PAIR in the initial phase (FERREIRA JÚNIOR, 1998).
  - Suggestive audiogram of hearing loss induced by high Levels of Sound Pressure: neurosensorial occurrence in the form of incision in the high frequencies (3000 and/or 4000 and/or 6000 Hz), higher or equal to 30 dB;
  - Non-suggestive audiogram of hearing loss by high Levels of Sound Pressure, suggestive of other auditory pathologies not associated to noise: non-characteristic audiogram of the incision in the high frequencies. The audiograms with probable concomitant occurrence of PAIR and with auditory pathology (hybrid trace) are included here. These traces are similar to the PAIR but, according to FERREIRA JÚNIOR (1998), in an atypical context, in relation to the most common characteristics of the PAIR.
- 4) Returnable: at the end of the evaluation, the result of the audiometric exam was handed in to the employees.

## Conducting the survey

In order to do so, the survey named “Beliefs and attitudes on hearing protection and hearing loss” was used, which had been developed and validated by researchers of NIOSH in the United States (SEPENSON & MERRY 1999. NIOSH contract NIOSH number 211-93-006) and previously used in the United States, Sweden and Brazil (STEPHENSON & MERRY 1999, SVENSSON et al., 2004, SARTORI, 2004). The referred survey searches for employees’ information on their beliefs and their behavior related to the prevention of hearing loss. It consists of twenty-eight statements, and is subdivided into ten thematic areas as it follows:

1. Perception of the susceptibility of acquiring hearing loss (statements 1, 13).
2. Perception of the severity of the consequences of hearing loss (statements 2, 14).
3. Perception of the benefits of a preventive action (statements 5, 16, 24).
4. Perception of the obstacles for a preventive action:
  - a) comfort (statements 6, 17, 25).
5. Perception of the obstacles to a preventive action:
  - b) attenuation of important sounds (statements 7, 18).
6. Perception of the obstacles to a preventive action:
  - c) communication (statements 8, 19, 26).
7. Perception of the obstacles to a preventive action:
  - d) convenience and availability (statements 3, 9, 20, 27).
8. Intentions of behavior (statements 10, 21, 28).
9. Social Rules (statements 11, 22).
10. Self-efficiency (statements s 4, 12, 15, 23).

The answers are given in a Likert scale from 1 to 5, with answers varying from “I totally agree”, answer number 1, to “I strongly disagree”, answer number 5. Each participant of the survey answered it individually right after the periodic audiometrics, having been given the survey by the Phonoaudiologist. In order to answer it, the employees were told to tick the alternative which best described their opinions on a particular statement. They were also told that there were no right or wrong answers, and the objective was to hear their opinion.

The survey was submitted to the reliability test, through the calculation of the alpha coefficient of Cronbach, resulting in a coefficient equal to 0,768593, therefore, above the minimum desired value which is 0,7. This result shows that the obtained answers are reliable for the studied population.

## Statistical analysis

The analyses examined the relation between the scores for each thematic area in relation to the following

variables: age, gender, level of noise, results of the audiometrics, time working in the company, sector and work shift. For the statistic analysis of the scores, Descriptive Methods (average and standard deviation) were used, as well as determinations of the Coefficients of Correlation between the variables involved and the scores of the thematic areas. The Coefficient of Correlation of Spearman was used for the nominal variables (audio, gender and sector) whereas for the ordinal variables (age, time in the company, work shift and level of noise) the Coefficient of Correlation of Pearson was used. The level of significance of 5% was adopted to test the significance of the coefficient of correlations.

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## RESULTS

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### Audiometric results

It was observed that 60 interviewed employees (60%) showed audiometric exam with auditory liminars in the patterns of normality and 40 employees (40%) showed audiometric exam with hearing deficit, and 31 employees (31%) showed suggestive liminars of PAIR bilaterally, diagnosis provided by a labor’s doctor who assists the company, and 9 employees (9%) showed other hearing alterations.

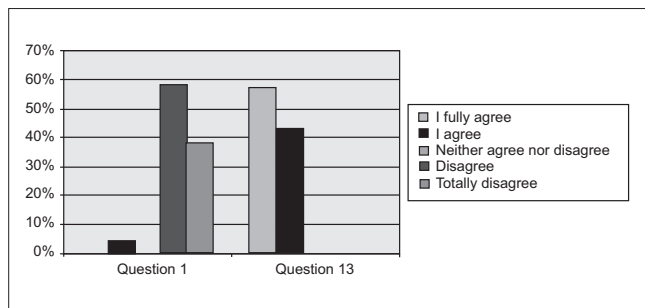
### Results of the answers of the survey

In relation to the participants’ time in the company and the exposure to noise, it varies from 10 to 39 years. Seventy employees who took part in the survey (78%) had been exposed to noise from 10 to 19 years, seventeen employees (17) had been exposed to noise from 20 to 29 years and, the other five employees integrating the survey (5%) had been exposed to noise for 30 to 39 years.

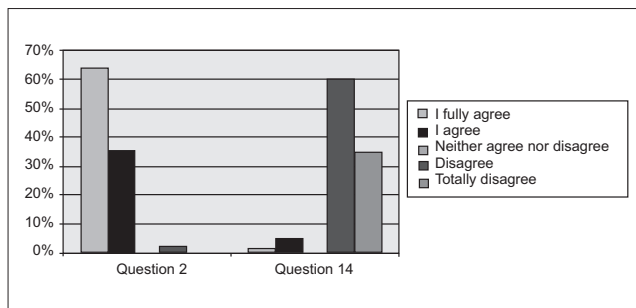
The survey was submitted to the reliability test, through the calculation of the alpha coefficient of Cronbach, resulting in a coefficient equal to 0,768593, however, above the minimum desired value is 0,7. This result shows that the obtained answers are reliable for the studied population.

What follows are the results of the 100 employees who answered the survey, according to the thematic area.

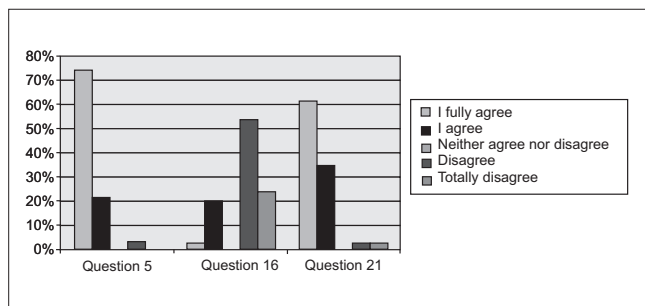
The Perception of the susceptibility of acquiring hearing loss was examined through two statements, numbers 1 and 13. Statement 1 was: “I think I can work close to loud noise and it will not harm my hearing”, while statement 13 was: “I believe the exposure to loud noise



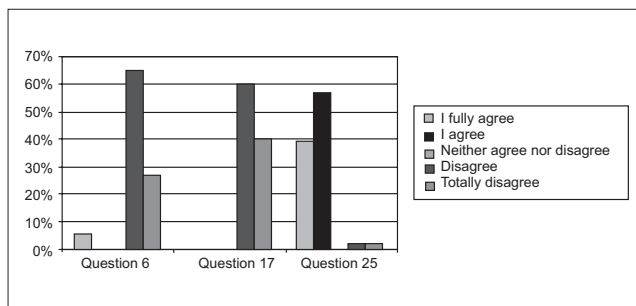
**Graphic 1.** Distribution in percentage of the participants of the study on the perception of susceptibility in acquiring hearing loss (statements 1 and 13).



**Graphic 2.** Distribution in percentage of the participants of the study on the Perception of the severity of the consequences of hearing loss (statements 2 and 14).



**Graphic 3.** Distribution in percentage of the participants of the study on the Perception of benefits of a preventive action (statements 5, 16 and 24).



**Graphic 4.** Distribution in percentage of the participants of the study on the Perception of the obstacles for a preventive action: a) comfort (statements 6, 17, 25).

may harm my hearing”. The percentage of the registered answers is in Graphic 1.

The Perception of the severity of the consequences of hearing loss was examined through two statements, number 2 and 14. Statement 2 was: “It would be difficult for people to talk to me if I lost part of my hearing”, while statement 14 was: “I do not think it would be a disadvantage to lose part of my hearing for having worked in a very noisy environment”. The percentage of the registered answers is in Graphic 2.

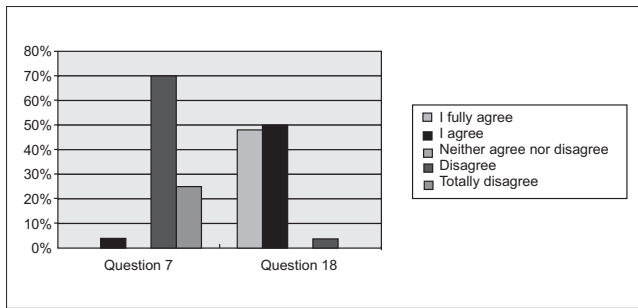
The are Perception of the benefits of a preventive action was examined through three statements, numbers 5, 16 and 26. Statement 5 was: “I am convinced that I can avoid hearing loss by wearing hearing protectors”, statement 16 was: “I cannot protect my hearing unless I wear hearing protectors in very noisy environments”, while statement 24 was: “If I really want to preserve my hearing, it is important to wear hearing protectors whenever I am close to loud noise”. The percentage of the registered answers is in Graphic 3.

The area Perception of the obstacles for a preventive action – Comfort was examined through three questions,

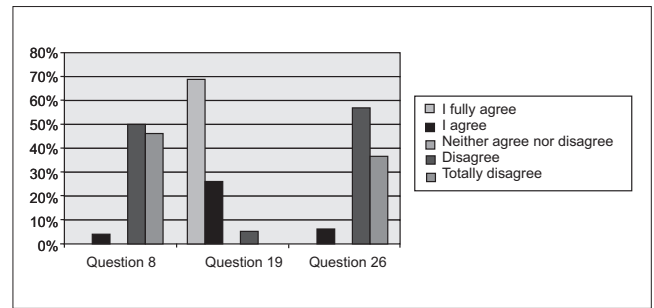
numbers 6, 17 and 25. Statement 6 was: “External protectors are very hot and heavy for me to wear when I am at work”, statement 17 was: “External protectors make a lot of pressure in my ears to be comfortable”, while statement 24 was: “Protectors can be comfortable if correctly adjusted”. The percentage of the registered answers is in Graphic 4.

The area Perception of the obstacles for a preventive action – Attenuation of Important Sounds was examined through two statements, numbers 7 and 18. Statement 7 was: “It is difficult to listen to warning signs such as backup beeps if I am wearing hearing protectors”, statement 18 was: “Wearing protectors does not keep me from listening to important sounds produced by the tools or machinery.” The percentage of the registered answers is in Graphic 5.

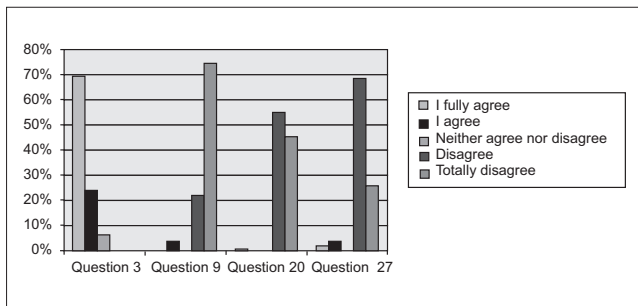
The area Perception of the obstacles for a preventive action – Communication was examined through three statements, numbers 8, 19 and 26. Statement 8 was: “I cannot wear protectors because I need to listen to people talking to me while I work”, statement 19 was: “I can understand the talks fairly enough to work while I am wearing protectors”, while statement 26 was: “Even when the place is not noisy, it is sometimes difficult to listen to



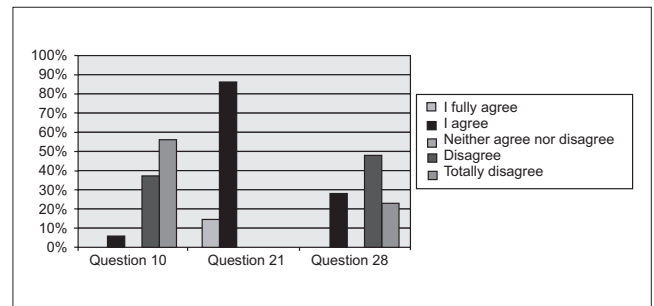
**Graphic 5.** Distribution in percentage of the participants of the study on the Perception of the obstacles for a preventive action: b) attenuation of important sounds (statements 7, 18).



**Graphic 6.** Distribution in percentage of the participants of the study on Perception of the obstacles for a preventive action: c) communication (statements 8, 19, 26).



**Graphic 7.** Distribution in percentage of the participants of the study on Perception of the obstacles for a preventive action: d) convenience and availability (statements 3, 9, 20, 27).



**Graphic 8.** Distribution in percentage of the participants of the study on Intentions of behaviour (statements 10, 21, 28).

people when they are talking to me”. The percentage of the registered answers is in Graphic 6.

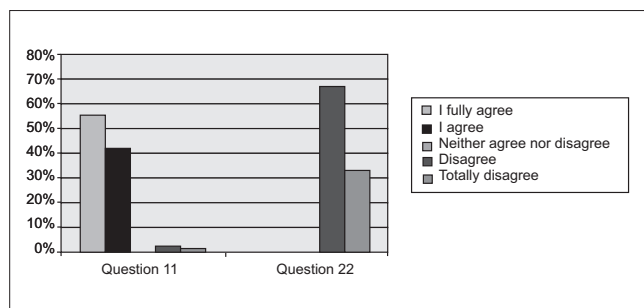
The area Perception of the obstacles for a preventive action – Convenience and Availability was examined through four statements, numbers 3, 9, 20 and 27. Statement 3 was: “In my workplace there are hearing protectors easily available for me to wear”, statement 9 was: “Getting hearing protectors for me to wear at work is not convenient for me”, statement 20 was: “At work I can choose from several and different types of protectors to wear”, while statement 27 was: “Hearing protectors are not very expensive for me to buy”. The percentage of the registered answers is in Graphic 7.

The area Intentions of Behaviour was examined through three statements, numbers 10, 21 and 28. Statement 10 was: “I do not intend to wear protectors when I am close to machines or equipment that produce loud noise”, statement 21 was: “I usually wear protectors whenever I work close to loud noise or noisy machinery”, while statement 28 was: “If I had a hearing protector with me, I would wear it whenever I were close to any noise which were loud enough to harm my hearing”. The percentage of the registered answers is in Graphic 8.

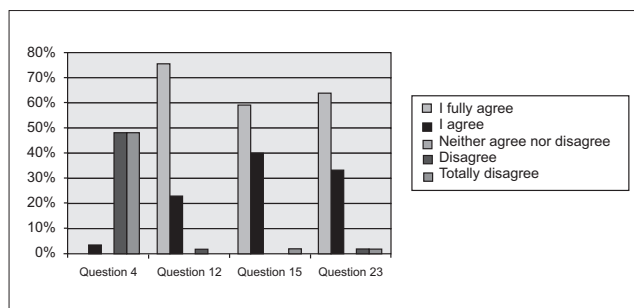
The area Social Rules was examined through two statements, numbers 11 and 22. Statement 11 was: “My co-workers usually wear protectors when they work in an environment with risky noise”, while statement 22 was: “My co-workers do not usually wear protectors when they need to work in noisy places”. The percentage of the registered answers are in Graphic 9.

The area Self-efficacy was examined through four statements, numbers 4, 12, 15 and 23. Statement 4 was: “I cannot always say when I need to wear hearing protectors”, statement 12 was: “I believe I know how to adjust and use the hearing protectors”, statement 15 was: “I can tell when an internal protector can be replaced”, whereas statement 23 was: “If my co-workers asked me, I would be able to show them the right way of using the hearing protectors”. The percentage of the registered answers are in Graphic 10.

The calculation of the scores for each thematic area of the survey, which had been previously described, and the analysis of the way the scores of the survey are related to the other variables of the study, which include: audio, gender, age, time in the company, shift, sector, level of noise in the workplace, are exposed in table 1. It includes



Graphic 9. Distribution in percentage of the participants of the study on Social Rules (statements 11, 22).



Graphic 10. Distribution in percentage of the participants of the study on Self-efficiency (statements 4, 12, 15, 23).

Table 1. Correlation between the descriptive variables of the population according to the thematic areas of the survey.

	Audio	Gender	Age	Time in the company	Work Shift	Sector	Level of Noise
1. Perception of the susceptibility to acquire hearing loss	0.385	0.284	0.261	0.543	0.903	0.949	0.379
2. Perception of the severity of the consequences of hearing loss	0.348	0.458	0.795	0.086*	0.638	0.491	0.255
3. Perception of the benefits of a preventive action	0.694	0.364	0.641	0.090*	0.277	0.269	0.193
4. Perception of the obstacles for a preventive action –							
a) comfort	0.389	0.722	0.124	0.475	0.858	0.748	0.041*
b) attenuation of important sounds	0.056*	0.658	0.906	0.441	0.623	0.683	0.274
c) communication	0.024	0.437	0.272	0.675	0.981	0.540	0.875
d) convenience and availability	0.508	0.726	0.584	0.469	0.470	0.006	0.580
5. Intentions of behavior	0,761	0,482	0,531	0,630	0,916	0,569	0,546
6. Social Rules	0,968	0,972	0,242	0,779	0,686	0,135	0,650
7. Self-efficiency	0,029	0,475	0,765	0,003	0,941	0,627	0,405

the p values for the test of significance of the correlation between the scale in each thematic area and the considered variables. For the nominal variables (resulted from the audiometrics, gender and sector) the coefficient of correlation used was the Coefficient of Contingency, whereas for the ordinal variables (age, time in the company, shift and level of noise), the Coefficient of Correlation of Spearman was used. At the level of significance of 5% (0,05), the correlation is only significant if  $p < 0,05$ . In table 1, the p values are written in bold for the significant correlations, and an asterisk indicates the correlations that have not reached but are very close to the level of significance.

## DISCUSSION

The present study verified the knowledge of the employees who are exposed to industrial noise on hearing loss and noise. This knowledge is important for the promotion of auditory health. Variables that can be

associated with the knowledge and attitude of the employees in relation to the exposure to noise and the risk of hearing loss were considered.

The analysis of the audiometric results shows that 60 (60%) of the participant employees, out of 100, showed auditory limiar within the standards of normality bilaterally, and 40 (40%) of the employees who participated in the research showed hearing deficit bilaterally. Among these 40, 31 (31%) showed audiometric exam suggesting hearing loss, induced by noise (PAIR) and 9 (9%) showed some other hearing alterations.

The chosen method gathers information that can reveal the main points and the weak ones, in other words, the ones that need to be dealt with in an educational program, or still, in possible changes in the policy of the company. However, most of the employees stated that it is long and hard to understand, and therefore they suggest that the method should be simplified without losing its main characteristics.

SARTORI (2004) made a work similar to this one with the employees of a company whose main activities are: extraction of vegetal oil, production of bran and receiving soybean in the city of Joaçaba/SC, aiming to evaluate the knowledge and behavior of the employees in relation to the exposure of existing noise in the company.

SVENSSON et al. (2004) made a work similar to this one in Sweden, where the convictions and attitude of the employees on hearing and hearing loss prevention were examined, especially the way it influences the use of their hearing protectors. It also compared this data to the exposure to noise, hearing ability and age. 95% of the participants answered that they knew that loud noise can harm their hearing, 90% of them considered that hearing loss would be a serious problem and 85% believe that the hearing protector can protect their hearing.

This data is similar to that described in the results of this work, where 100% of the employees agree that the exposure to loud noise can harm their hearing, 98% of them agree that hearing loss would be a serious problem to them, and 96% are sure that the hearing protectors can protect their hearing and avoid hearing loss.

Contrary to the answers obtained by SVENSSON et al. (2004), which are low percentages of employees who always “wear a hearing protector” when exposed to noise, 55% of the employees said that they could not hear signs of warning when they are wearing the auricular protector and 45% of the workers said that they consider the hearing protector uncomfortable. The answers found in this work show that 100% of them state that they usually wear the hearing protector when they are working close to loud noise or noisy machinery, and 96% disagreed that it is not possible to hear signs of warning such as backup beeps while they are wearing the hearing protector, and still 98% of them state that the hearing protectors can be comfortable if correctly adjusted.

WILLIAMS et al. (2004) also developed a project on the employees’ knowledge, which examined the perceptions of countryside workers related to the exposure to noise and hearing. Audiometric tests were compared with perceptions of noise while being risky to the hearing and preventive actions. The perceptions of noise at work tended to be more positive when people were feeling that they had had hearing problems. There was no difference between preventive actions among the groups. It was concluded that there is the necessity of specific training to provide the countryside workers

with abilities to do something in order to reduce their exposure to noise while working.

Based on these comparisons it is possible to notice that some results are similar and others different, which may refer to the different performed activities, different practices adopted by the companies, ways of approaching hearing protection, encouragement to wearing the protector and some other aspects.

The survey used in this work revealed that the employees have good knowledge of the effects of loud noise over our hearing and daily life, as well as dealing with the co-workers during the work shift, and the effects of preventive actions that aim comfort, convenience and other aspects where the necessity and benefits of the correct use of the auricular protector is noticed, and also the consequences of its misuse. Most of them stated to know the right way of wearing the hearing protector and when it needs replacing.

It was observed in the thematic area perception of the obstacles for a preventive action, section convenience and availability, that 99 (99%) of the employees disagreed with the statement “At work I can choose from several and different protectors to wear”. This disagreement, in considerable number, happened due to their reality in the company, where there is no option of choice of protector. All the employees wear an auricular shell type, model 3M 1435 and 3M 1450, according to the sector of work and activity. It was noticed that the employees want to be given the choice of type for the hearing protector they would like to wear, or that it should be more comfortable. For this reason, the SESMT were recommended to have a variety of types and models of hearing protectors available, so that the employee could select the one that best adapts to himself/herself, based on comfort, facility of use and control, among others, and also that the employees should be given individual training at the time of selecting the protector, concerning its use, repairing, cleaning and substitution.

SVENSSON et al. (2004), in his research with Swedish employees, also observed that in the studied companies, the employees had a limited number of alternatives to choose a hearing protector, and had not been given any special training on how to wear it, how to take care of it and how to maintain it. Because of that, after they had received information from the survey, it was recommended that a variety of styles of hearing protectors should be provided, so that the workers could select a gadget based on comfort, facility of use and control, and facility for communication. He still suggests that each employee should be given individual training in the



selection, while adjusting the use, repairing and substitution of the hearing protector.

Still talking about the results, what follows are the significant correlations between the thematic areas and some variables.

It was noticed that for the thematic area Perceptions of the obstacles for a preventive action, section comfort, the variable level of noise is significant. It happens because all the participants of this study wear the same protector, independently of the level of noise to which they are exposed to, in other words, all of them wear a shell hearing protector. As previously mentioned in the beginning of this study, some employees used to wear the shell hearing protector, models which had been previously mentioned, but as the research was being carried out, due to an order from the manager, all the employees were given shell hearing protectors models 3M 1435 or 3M 1450, independently of their work sector and/or the level of noise in this sector. So, the employees started to wear this particular type of protector, which caused a feeling of discomfort and even rejection by some employees who during their time of activity in the company, had always worn a plug protector and now had to adapt themselves to the shell protector. In addition to that, the employees face difficulties related to the adaptation and the comfort of the hearing protector imposed by the company for several reasons such as wearing a hood, glasses and/or protection glasses which are worn in a specific sector, a helmet and others, for the hearing protector is indispensable once noise is an agent of risk in all the sectors of the company. So, the use of hearing protector of only one type for all the sectors should be reviewed, respecting the level of noise as a harmful agent and the comfort of the employees, searching for an intermediary alternative.

It was still observed that for the thematic area Perception of the obstacles for a preventive action, section communication, the variable resulting from the audiometrics is significant, which suggests that people who have altered hearing experience some difficulty in communication when wearing a hearing protector. Each of these cases should be individually reviewed, searching for a protector that does not interfere in the communication, but still offers the necessary attenuation.

It was noticed that for the thematic area Perception of the obstacles for a preventive action, section convenience and availability, the variable Work Sector is significant. It suggests that people face difficulties related to the availability of different types of protectors, for the company leaves only one type of hearing protectors

available, which is the shell type. Once again it is suggested a review of these cases, searching for a hearing protector that adapts each employee, taking into consideration the sector where they work and the activity they do, and the level of noise which they are exposed to.

It was also verified, for the thematic area Self-efficiency that the variable resulting from the audiometrics is significant. This association probably occurs because when the employee notices the result of their audiometrics, followed by information, they learn that they can really prevent the hearing loss. What is more, the employees take part, individually and collectively, in integrations and reintegrations, trainings, competitions, among other events carried out by the PHC and Labor Security, with the other sectors of the company approaching the themes Hearing and Hearing Protection as the main theme. All these activities enable the employees to become more confident and active, allowing them to believe that it is possible to protect their own hearing.

It was also observed that for the theme area Self-efficiency, the time variable of the company is significant. Through these results it is possible to state that the longer the time in the company, longer the time of wearing hearing protectors, larger the number of participations of the employees in activities related to training, lectures, integrations, reintegrations, more auditory evaluations, more changes of hearing protector, in other words, more integration of the employee with the PHC actions of the company, creating more information and attitude, and a larger perception of the way the individual can protect his/her own hearing.

The analyses carried out by SVENSSON et al. (2004) in his research with Swedish employees identified significant differences related to the misuse of the hearing protector related to the age, time in the company and different groups of companies.

It is worth to say once more that even though most of the answers are satisfactory and show the knowledge of the employees on noise and hearing loss, it is really important to renew and improve this knowledge, for once the employees are updated, it will be possible to reach an efficient production, with adequate levels of security and protection, and it will be possible to improve the concepts and answers described in this work even more.

Finally, it was possible, through the gathered information, to notice that there is a significant population who shows auditory deficit or non-hearing loss induced by noise, and in this way, a new training with emphasis

on “Hearing Protection”, as well as the solicitation of change of hearing protector, in case they are in bad condition, was inserted in the planning for all the employees already wear a shell protector. The permanence of the audiologic evaluation every six months was also reinforced in these cases, as well as sending them to the Labor’s Doctor of the Company and/or Otorrinolaringologista, among other actions described in this work. The survey also showed that the employees are aware of the necessity of the hearing integrity for their own well-being and of the people around them, of the ways of hearing protection, as well as the consequences of the misuse of the auricular protector, the noise harms to the body and to work but, as previously mentioned, knowledge can only be built day by day, continuously.

So, it is suggested that actions like individual and collective advisement, integrations, reintegrations, training, educative lectures, competitions and all the other activities proposed by the SESMT Team, especially the PHC Team who manages and performs great part of these activities should remain active in the company, disseminating information and raising in the employees the interest in getting to know how to protect their hearing, how and why to wear the hearing protector correctly, encourage other co-workers to protect themselves by teaching them how to adjust their protector correctly, make the employees active members in the protection and security matter, relating to your own protection and security, and that they should not simply wait for other people do things for them.

It is essential that the Phonoaudiologist shows his/her work in an ethic way and proves to be necessary in the team, conquering their territory and aiming to work more for the health and quality of life of our workers, who are badly assisted in several situations. It is up to the health experts specialized in employee’s health to know the risks and the consequences of these exposures, as well as the rules and laws which control these activities.

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## CONCLUSION

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The present work aimed to verify the knowledge of the employees who are exposed to industrial noise in relation to the hearing loss and the noise. This knowledge enables the health professional to identify some factors and propose efficient ways of improving the knowledge of the employees, as well as direct the actions proposed and developed by the PHC of the company.

The survey, the main resource used, is

recommended to professionals and researchers in the Phonoaudiology – Occupational Audiology area, in the evaluation of the program of auditory conservation. However, during its application in this work, it was noticed that most of the participants of the research claimed that the Portuguese version of the survey is difficult to understand, and therefore needs to be reviewed and validated.

Statistically significant correlations between the thematic area Perceptions of the obstacles for the preventive action (comfort) and the level of noise in the working environment, Perception of the obstacles for the preventive action (communication) and the result of the audiometrics, Perception of the obstacles for the preventive action (convenience and availability) and the working sector, Self-efficiency and the result of audiometrics, Self-efficiency and the time of the company were all observed. The results found in this work show the effectiveness of the program of auditory conservation which is carried out in the company, as well as the knowledge of the employees on hearing and hearing protection.

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